

SUBJECT INDEX

A

- Abscissic acid**
Phytophthora infected plants, 221
- Acromonium**
coenophialum, 295, 301, 307-8
 chemical control, 299
 detection by insect bioassay, 298
 endophyte origin, 307
 ergot alkaloids, 306
 fescue toxicosis, 300
 growth of host, 303
 peramine, 305
 serology, 297
 viability in seed, 298
- loli*, 295-96, 301, 307-8
 chemical control, 299
 endophyte origin, 307
 growth of host, 303
 peramine, 305-6
 ryegrass staggers, 300-1
 serology, 297
 viability in seed, 298
- species**
 symbiosis type, 302
- Acrolein**, 238
- Adenylate cyclase**, 412
- Aeciospores**
 host penetration, 234
- Aflatoxin**
 see *Aspergillus flavus*, aflatoxin formation
 epidemiology
- Agrobacterium**
rhizogenes, 92
tumefaciens, 100, 160
 agrocin, 84, 101
 analogs of *Rhizobium* genes, 151
 host-range gene, 156
 pathogenicity basis, 90-92
 T-DNA vector, 97, 102-3
- Agrocin** 84, 101
- Ahmad**, J. S., 80
- Alabouvette**, C., 76
- Allen**, M. C., 71
- cAMP**, 240, 243, 411
- Anderson**, M. E., 54
- Anguina tritici**, 327
- Appressorium**
 see Rust fungi, changes during appressorium development
- Armellaria mellea**
 epidemiological studies, 395

- Aspergillus flavus*, aflatoxin formation epidemiology, 249-70
 biology, 250-51
 dispersal, 252
 factors influencing infection and aflatoxin formation, 258
 insect damage, 264-65
 moisture, 261-64
 other factors, 265-66
 substrate, 258
 temperature and time, 259-61
 introduction, 249-50
 mode of entry for infection
 boll sutures, 256
 developing fruit, kernels, and seed, 256-58
 flowers, 253-55
 stem, bract, and peduncle, 255
 primary inoculum, 251
 secondary inoculum, 251-52
- Aspergillus nidulans*, 95, 386
 transformation, 94
- Aspergillus niger*, 261, 265
Aspergillus flavus competitor, 262
- Aspergillus parasiticus*, 249
 biology, 250
- Atkinson**, T. G., 74
- Atmosphere**
 see Plant pathogens, modeling
 long-range transport in the atmosphere
- Atmospheric Transport and Dispersion (ATAD) model**, 170, 183
 atmospheric transport layer definition, 171-72
 model type, 179
 model verification, 184-85
- Auxin**, 341
- Azospirillum*, 154

B

- Babcock**, E. B., 46, 49
- Bacterial blight of rice**, 359-82
 description of the disease, 359-60
 symptoms, 360
 description of the pathogen
 controversy on physiologic specialization, 362-63
 differential systems for race identification, 365-68

- evidence for physiologic specialization, 363-65
 pathogenicity variation, 361-69
 pathogenic specialization, 362
 shifts in virulence 368-69
 taxonomic status and phenotypic variation, 360-61
 virulence in relation to bacteriological properties, 369-70
- disease resistance**
 future prospects, 377-79
 infection types, 374-75
 inoculation methods for resistance evaluation, 370-71
 resistance genes, 375-76
 resistance mechanisms, 376-77
 resistance types, 371-74
 varietal resistance grouping, 371
- Baker**, K. F., 71, 75
- Baker**, R., 76, 80
- Balansia**
epichloe, 301
 auxinlike compounds, 304
 spp.
 animal toxicosis, 301
 symbiosis type, 301
- Bancroft**, K., 71
- Barrons**, K. C., 68
- Basidiospores**, 235
- Rhizoctonia**
 epidemiological role, 137-38
 rust fungi, 238-39
 appressoria, 237
 host penetration, 233-34
- Bean pod mottle virus**, 113-15
 weed host importance, 116
- Bean rugose mosaic virus**, 115
- Beetles**
 see Viruses, beetle transmission
- Belonolaima* spp., 330
- Benomyl**, 299, 388
- Bentley**, Robert L., 44
- Biological control of plant pathogens**, 67-85
 after 1965, 74-75
 cross-protection, 81
 effect of stress on host, 78-79

- effect of stress on microorganisms, 77-78
 gene manipulation, 83-84
 general suppression in suppressive soils, 75
 growth-promoting rhizobacteria, 82-83
 hypovirulence, 81-82
 integrated biological control, 76-77
 nutrient base, 79
 parasites of sclerotia, 82
 possession principle, 77
 protecting plant propagules, 80-81
 specific suppression in suppressive soils, 75-76
 stress effects, 77
 suppressive soils, 75, 138
 thermal sensitivity of microorganisms, 80
- before 1965
 cross-protection, 71-72
 developments by 1934, 72-73
 fungistasis, 69
 groundwork for new field, 73
 growth-promoting rhizobacteria, 72
 hypovirulence, 72
 interactions of microorganisms, 67-69
 integrated biological control, 70
 nutrient base, 71
 possession principle, 70-71
 protecting plant propagules, 71
 rhizosphere studies, 69
 stress effects, 71
 suppressive soils, 69-70
 thermal sensitivity of pathogens, 71
- epilogue, 84-85
 increase in published papers numbers, 74
 introduction, 67
Rhizoctonia, 138
 Biraghi, A., 72
 Bitertanol, 299
 Bliss, D. E., 70
 Boots, William, 45
 Börger, H., 71
 Boswell, V. R., 73
Bradyrhizobium, 151
japonicum
 host-specific nodulation genes, 158
 nod box, 153
 Branching Atmospheric Trajectory (BAT) model, 170, 183
- model type, 179
 modeling the diffusion process, 176
 wind shear, 172
- Bremia lactucae*, 387
 multilocus genotypes, 393
 probe source, 389
 restriction fragment length polymorphism detection, 390
- Broad bean stain virus, 114
 seed-borne infection, 116
- Broad bean true mosaic virus, 114
 seed-borne infection, 116
- Broadbent, P. 75, 83
 Broadfoot, W. C., 68
 Bromoviruses, 112
 Bruehl, G. W., 74
 Bupirimate, 192
 Burke, D. W., 78
- C
 Calcium, 240, 286, 407, 416
 Calmodulin, 240
 Cantaloupe
 salinity effect on fruit weight, 284
 Carbendazim, 204
 Carbon dioxide, 276
 Carotovirin, 413
 Carroll, Jessie Anna, 48
 Carter, M. V., 77
 Cauliflower mosaic virus, 12, 16, 18
 Cell wall-degrading enzymes, 31-33
 Cellobiose, 418
 Cellulase, 421
 secretion, 419-20
 Cellulose
 degradation, 418
Ceratobasidium, 126, 131
 Chet, I., 76
 Chinn, S. H. F., 69
 Chitin, 239
 Chitinase
 synthesis gene, 101
 Chlamydoconidia, 322-23, 326
 Chloride, 275, 278, 283, 286
 seasonal change in peanut, 279-80
 Chrysomelidae, 113
Clavibacter, 148
Claviceps purpurea, 386
 Clavine, 300
 Coccinellidae, 113
Cochliobolus heterostrophus, 95, 386-88
 Cocksfoot mottle virus, 113
 Coley-Smith, J. R., 78
 Comoviruses, 112
- Conidia
Aspergillus, 251-54, 256
 Cook, R. J., 77-78
- Corn
Aspergillus
 aflatoxin formation, 260-63, 265
 invasion, 253-54, 257
 salinity effect
 osmotic potential, 273
 water potential, 274
Corticium microsclerotia, 133
 Costa, A. S., 81
- Cotton
Aspergillus
 aflatoxin formation, 261, 263-66
 invasion, 254-58
 Cowpea aphid-borne mosaic virus, 117
 Cowpea chlorotic mottle virus transmission, 117
 Cowpea mosaic virus, 13
 Cowpea severe mosaic virus, 115, 117
 host effect upon spread, 116
 weed hosts, 116
 Cruickshank, I. A. M., 71
 Cucumber mosaic virus, 13, 103
 inactivation by RNase, 118
 Curculionidae, 114
 Cutinase
 gene, 95-96
 Cyanide, 342-45, 350-51
 Cycloheximide, 388
 Cytokinins, 330
Phytophthora-infected plants, 221
- D
 Darling, H. M., 53
 Day, P. R., 82
 Deuterium oxide, 242
 Dickson, J. G., 53
Dilophospora alopecuri, 327
 Disease control, relation of art and science
 conclusion, 7-8
 etiology, 2-7
 concept, 2-5
 introduction, 1
 separating art from science, 1-2
 Disease resistance, 34-37
 induced resistance, 37-39
 DNA base composition
Rhizoctonia, 134
 restriction fragment length polymorphisms
 see Genetic analysis of phytopathogenic fungi

- sequence homology
Rhizoctonia, 134-35
 mtDNA, 385-86
 Dobbs, C. G., 69
 Duggar, B. M., 55
- E
- Elasmopalpus lignosellus*, 264
Endothia parasitica
 dsRNA, 386
Epichloe typhina, 295, 305
 detection, 297
 distribution in plant, 302
 effects on plant growth, 304
 evolution, 308
 symbiosis type, 301-2
 Ergonovine, 305, 307
 Ergot alkaloids, 300, 305-6
 Ergotamine, 305, 307
 Ergovaline, 300, 305
Erysiphe graminis, 194, 201-3
Erwinia
amylovora, 147, 158
carotovora, 151
 pectate lyase genes, 93
carotovora subsp. *atroseptica*, 405
 pectate lyase effect on plant tissues, 415
 pectate lyase genes, 409-10
 pectate lyase isozymes, 407, 409
 pectin lyases, 410
 polygalacturonase, 410
carotovora subsp. *betavascularum*, 405
carotovora subsp. *carotovora*, 405, 416, 421, 423
 cellulose degradation, 418
 hemicellulases, 419
 lipopolysaccharide, 421
 pectate lyase effect on plant tissues, 415
 pectate lyase genes, 408-9, 420
 pectate lyase isozymes, 407-8, 414
 pectate lyase synthesis regulation, 411
 pectin lyases, 410
 pectin lyase synthesis regulation, 413
 polygalacturonase, 410, 422
 polygalacturonase role in virulence, 415
 proteases, 418-19
chrysanthemi, 405
 cellulase and pectinase secretion, 419-20
 cellulose degradation, 418
 hemicellulases, 419
- iron acquisition and pathogenicity, 422
 lipopolysaccharide, 421
 pectate lyase effect on plant tissues, 415-16
 pectate lyase genes, 93, 408-9, 410
 pectate lyase induction, 411
 pectate lyase isozymes, 407-8, 410, 414, 416, 422
 pectate lyase synthesis regulation, 411-13
 pectinases role in virulence, 414-15
 pectin lyases, 410, 419
 pectin lyase synthesis, 413
 pectin methylesterase gene, 408
 proteases, 418-19
cypripedii, 405
rhapontici, 405
rubrifaciens, 422
 Essig, E. O., 49-50
 Ethirimol, 192
 Ethylene, 341
 Exopolysaccharide, 158-61
- F
- F-actin, 235-36, 242
 Farlow, W. G., 43
 Fenpropimorph
 apparent activity and inoculum density, 198
 Fescue toxicosis, 300
 Filamentous distalsome, 235
 Fire
 effect on *Phytophthora cinnamomi*, 214
 Fleming, A., 68
 Flor, Harold Henry, 59-66
 contributions, 61-65
 early years, 59-61
 introduction, 59
 the man, 65-66
 Fokkema, N. J., 79
 Fox, R. A., 71
 Fulbright, D. W., 82
 Frankia, 154
 Fungal endophytes of grasses, 293-315
 animal toxicities, 299-300
Balansia-infected weed grasses, 301
 fescue toxicosis, 300
 ryegrass staggers, 300-1
 concluding remarks, 309-10
 grass-fungus interactions
 benefits to the fungus, 302
 benefits to the host, 303-7
 disease resistance, 307
 growth of host, 303-4
- insect species affected, 304
 origins, 307-8
 parasitic and mutualistic symbiosis, 301-2
 tolerance to grazing herbivores, 307
 tolerance to insect herbivores, 304-7
 historical perspectives, 294
 chemical control, 299
 classification, 295
 control methods, 298-99
 culture of fungi, 297-98
 detection methods, 296-98
 heat effect, 298
 incidence, 295-96
 insect bioassay, 298
 mycelium staining, 297
 seed storage effect, 298
 serology, 297
 introduction, 293-94
 use of infected and noninfected grasses, 308
 endophyte-free cultivars, 308-9
 endophyte-infected grasses, 309
- Fungi
 see Genetic analysis of phytopathogenic fungi
 Fungicide screening, 189-206
 choice of organisms, 192-94
 fungicides used in world agriculture, 191
 proportion used on different crops, 192
 future developments, 204-5
 introduction, 189
 objectives and economic considerations, 189-90
 procedures for further evaluation
 bioassay for systemic and vapor activity, 203
 dew, 200
 metabolism, 200-201
 persistence, 199-201
 rainfastness, 200
 resistance, 204
 translocation, 201
 uptake and translocation, 201-4
 UV light, 200
 vapor activity, 201
 volatility, 201
 random screening and directed synthesis, 190-92
 screen procedures
 application methods, 195
 application rates, 194-95
 assessment, 198-99
 formulation, 194
 humidity chambers, 196-97

- inoculation, 197
inoculum density, 197-98
plant growth and incubation, 196
test unit and planting material choices, 195-96
- Fusarium*
oxysporum
 see *Fusarium* wilt fungi and root-knot nematodes interactions, 317-38
oxysporum f. sp. *apii*
 populations variation, 396
oxysporum f. sp. *conglutinans*, 386
oxysporum f. sp. *lycopersici*
 effect of root-knot nematodes on host resistance, 331-33
solanii f. sp. *pisi*
 cutinase gene, 95-96
Fusarium wilt fungi and root-knot nematodes interactions, 317-38
 ecology and biology of *Fusarium* wilt fungi, 321-25
 disease symptoms, 323
 host invasion, 322-23
 host resistance types, 324-25
 host response to invasion, 323-24
 hosts, 321
 variation, 322
 ecology and biology of root-knot nematodes, 319-21
 effects on plants, 321
 life cycle, 319-20
 population composition, 319
 survival, 319
 symptoms of infected plants, 320
 interrelationships, 325-26
 interactions in the rhizosphere prior to penetration, 326-27
 modification of host reaction to fungus, 331-32
 nematode influence on fungus penetration and pathogenesis, 328-31
 nematode vectors of fungal propagules, 327-28
 introduction, 317-19
 summary and conclusions, 332-34
- G
Gaeumannomyces graminis var. *tritici*, 353
- β -Galactosidase, 412-13
- Genes
 identification, 397
 involved in bacteria-plant interactions, 162
 Rhizobium
 common nodulation genes, 152-55
 host-specific nodulation genes, 155-58
 nod genes, 151-52
 rice
 resistance to bacterial blight, 369, 373-76
 sexual compatibility and vegetative incompatibility molecular markers, 387
 soft-rot erwinias
 cellulose degradation, 418
 pectate lyase, 408-13, 420
 pectin methyltransferase, 408
 polygalacturonases, 410
 protease, 419
 virulence genes as markers, 387-88
 Gene-for-gene relationship, 96, 146, 155
 approaches to study, 98-100
 molecular markers, 387
 see also Flor, Harold Henry
 Genetic analysis of phytopathogenic fungi, 383-404
 applications of molecular markers
 asexual variation, 394
 epidemiology and population genetics, 395-96
 gene identification, 397-98
 genetic bases of variation, 393-94
 genetic maps, 388-93
 genome organization and evolution, 392-93
 integration with electrophoretic karyotype, 391-92
 polymorphisms identification, 390
 probe sources, 389-90
 quantitative traits analysis, 391
 segregation analysis, 390-91
 sexual variation, 393-94
 taxonomy and phylogenetic relationships, 396-97
 conclusions, 398-99
 drug resistance and auxotrophic mutants, 388
- introduction, 383-84
 molecular markers advantages, 383
 molecular markers
 isozymes, 384
 double-stranded RNA, 386
 mitochondrial DNA and plasmids, 385-86
 restriction fragment length polymorphisms, 384-85
 morphological markers, 386-87
 sexual compatibility and vegetative incompatibility genes, 387
 virulence genes, 387-88
 Genetics of pathogenesis by soft-rot erwinias, 405-30
 conclusions and prospects, 422-23
 extracellular enzymes, 418
 cellulose degradation, 418
 hemicellulases, 419
 proteases, 418-19
 host-parasite recognition, 420
 iron acquisition role, 421
 lipopolysaccharide role, 421-22
 introduction, 405-6
 pectinases of soft-rot erwinias, 406
 pectate lyases, 406-10
 pectin lyases, 410
 polygalacturonases, 410
 pectinases role in pathogenicity
 effects on plant, 415
 expression in infected plant, 414
 isozyme numbers, 416-17
 requirement for virulence, 414-15
 regulation of pectate lyase synthesis, 411
 catabolite repression, 411-12
 inducers, 411
 negative control by *gpiR* gene, 412
 negative control by *kdgR* gene, 412
 negative control of *peIA* by *pecR* gene, 413
 positive control by *pecA* gene, 412-13
 regulation of pectin lyase synthesis, 413
 secretion of pectinase and cellulase, 419-20
Gerlagh, M., 76
Ghabrial, S. A., 72

Gibberellins, 330
 Gilbert, R. G., 78
 endo- β -1,4-Glucanase, 418
 Glycine, 342, 344
 cGMP, 240
 Gold, Herb, 27
 Grasses
 see Fungal endophytes of
 grasses
 Grente, J., 72, 81
 Grossbard, E., 68
 Growth-regulating substances,
 33-34

H

Haenseler, C. M., 71
 Harman, G. E., 75
 Hartig, Robert, 43
 Hartley, C., 68
 HCN, 341-43, 351-53
 Heat
 fungal endophytes control,
 298-99
Helminthosporium victoriae, 98
 Hemicellulases, 419
Hemileia vastatrix, 237
 Henry, A. W., 68
Heterobasidion annosum
 epidemiological studies, 395
 Hickmott, R., 45
 Hiltner, L., 69
 Hinson, W. H., 69
 Hydathodes
 Xanthomonas invasion route,
 377
 Hygromycin B., 95
 Hypersensitive reaction
 Erwinia, 422
Rhizobium, 161
Hypochnus sasakii, 127
 comparison with other *Rhizo-*
 tonia groups, 131

I

Ice nucleation gene, 100
 Indole acetic acid, 324, 341
 genes in *Pseudomonas*, 92-93
 Infection strategies, 146-49
 Inoculation methods
 bacterial blight of rice, 370-
 71
 Iron, 343-44, 346-48, 352
 acquisition role in pathogenic-
 ity, 421
 Isozymes, 384-85, 393, 396
 pectate lyases, 407-10, 417-
 18, 422
 in infected plant, 414
 role in virulence, 414-15
 phenotypes, 394

J

Jarrah dieback
 see *Phytophthora cinnamomi*
 in Australasian forests
 Jones, Henry A., 54-55
 Jones, L. R., 51
 Joslyn, M. A., 27

K

Katan, J., 78
 Keitt, G. W., 53
 Kerr, A., 81
 King, J. E., 78
Klebsiella aerogenes
 ribitol dehydrogenase gene,
 158
 Kloepper, J. W., 83
 Kojic acid, 250, 258
 Kommedahl, T., 75

L

Larson, R. H., 53
 Leach, R., 70
 Lectins, 149, 158-60, 239
 Lindberg, G. D., 72
 Linderman, R. G., 78
 Lindow, S. E., 79
 Lipopolysaccharide
 role in pathogenicity, 421-22
 Lister, R. M., 81
 Lochhead, A. G., 69
 Loline alkaloids, 300, 305-7
 Lolitrems, 300-1, 306
 Long-range transport of
 pathogens
 see Plant pathogens, modeling
 long-range transport in
 the atmosphere
Lycopodium
 spores deposition velocity,
 180-82

M

Magnaporthe grisea, 386-87
 Maintenance respiration, 275
 Maize chlorotic mottle, 113
 Manns, M. M., 70
 Marx, D. H., 79
 McBeth, C. W., 68
 McClure, T. T., 72
 McKinney, H. H., 71
Melampsora lini
 asexual variation, 394
 avirulence genes as molecular
 markers, 387
 Flor's contributions, 61-65
 heat shock proteins, 241
 Meloidae, 114

Meloidogyne

arenaria
 races, 319
hapla, 319
incognita, 328
 effect on tomato resistance
 to *Fusarium*, 331-33
 infected plants exudates
 effect on fungi, 326
 races, 319
javanica, 319
 Fusarium in rhizosphere of
 infected plants, 326
 giant cells activity, 329-30
 host response to *Fusarium-*
 Meloidogyne infection,
 329
 see also *Fusarium* wilt fungi
 and root-knot nematodes
 interactions, 320
 Menzies, J. D., 70
 MESOPUFF II, 170, 183
 spore deposition velocity, 180
 wind field selection, 172-73
 Millard, W. A., 68
 Mishustin, E. N., 72
 Mitochondrial plasmids, 386
 Mitomycin C, 410, 413
 Moffitt, E. M., 81
 Moisture
 effect
 aflatoxin formation, 261-64
 jarrah dieback, 212
 Molecular genetics impact on
 plant pathology, 87-110
 basic principles and tech-
 niques, 87-90
 complementary DNA, 89
 cosmid vectors, 89
 DNA degradation, 88
 gene structure, 87-88
 plasmid vectors, 88-89
 probes, 90
 transposons, 89
 biological control
 bacteria, 100-2
 cross-protection by viruses,
 102-3
 satellite RNA, 103
 viruses, 102
 future, 104
 genetic basis of avirulence,
 96-97
 genetic basis of disease resis-
 tance
 genetic engineering of
 plants, 97
 possible approaches to dis-
 ease resistance, 97-100
 genetic basis of pathogenicity,
 90
 bacteria, 90-94

- fungi, 94-96
 genome sizes of organisms, 91
 introduction, 87
 pathogen detection, 103
 Müller, G. W., 81
 Müller, K. O., 71
 Mycotoxins, 249
Myriogenospora atramentosa, 302
- N
- Nalidixic acid, 413
 Naumova, A. N., 72
Nectria haematococca
 pisatin detoxification and virulence, 95
Neurospora crassa, 390, 397
Nigrospora oryzae, 261
 Nitrate, 286
 Numerical weather-prediction models, 185
- O
- Olsen, C. M., 71
 Osmotic potential, 277
 corn leaves and water salinity, 273
 soil solution, 272
 Oxygen
 ion uptake inhibition, 285
- P
- Papavizas, G. C., 77
 Peanut
 Aspergillus
 insect damage effect on aflatoxin formation, 264-65
 invasion, 253, 256-57
 moisture effect, 261-62
 temperature effect, 259
 chloride concentration, 279
 seasonal change, 280
 Pectate lyases
 soft-rot erwinias, 406-7
 catabolite repression, 411-12
 effect on plant tissue, 415
 genes organization, 408-10
 inducers of synthesis, 411
 isozymes expression in plant, 414
 isozyme numbers, 417-18
 negative control, 412-13
 pathogenicity, 415-17
 positive control, 412-13
 requirement for virulence, 415
 secretion, 420
 separation and characterization of isozymes, 407-8
 synthesis regulation, 411-13
 Pectin lyases, 410
 Pectin methylesterase, 406
 gene, 408
 Pectinase, 421
 secretion, 419-20
 Pegg, K. G., 75
 Peramine, 305-7
Peronosclerospora philippinensis, 397
 sacchari, 397
 sorghii, 397
Peronospora tabacina, 170, 175, 179
 spores
 modeling production and escape, 182
 survivability, 180
 Perrin, D. R., 71
Phakopsora pachyrhiza, 233
 Phleum mottle virus, 113
 Phosphate, 286
 Physiological plant pathology, 27-40
 cell wall-degrading enzymes, 31-33
 disease resistance, 34-37
 growth-regulating substances, 33-34
 induced resistance, 37-39
 introduction, 27-28
 other subjects, 39-40
 toxins, 28-31
 Phytoalexins, 34-38, 324
 role in disease resistance, 94-95
Phytophthora cinnamomi
 multilocus genotypes, 393
 infestans
 asexual variation, 394
 isozyme loci variation, 393
 megakarya, 394
 megasperma
 variation, 397
 palmivora, 394
Phytophthora cinnamomi in Australasian forests, 207-29
 conclusion, 224-25
 damage to the forest, 216-18
 damage to the host, 218-21
 detection of disease and rate of extension, 215-16
 distribution, 210-11
 factors controlling disease, 211
 fire, 214
 moisture, 212
 soil characteristics, 212-13
 temperature, 211-12
 host susceptibility and resistance
 interspecific resistance, 221-22
 intraspecific resistance, 222-23
 introduction, 207-8
 management and control, 223-24
 mating type variability, 222-23
 problems posed, 208-10
 symptoms, 208
 variable life cycle, 214-15
 Pisatin, 95
 Plant growth-promoting rhizobacteria
 see Rhizosphere microorganisms, beneficial and deleterious
 Plant pathogens, modeling long-range transport in the atmosphere, 168-88
 conclusions, 185
 numerical weather-prediction models, 185
 data limitations to modeling, 182-83
 introduction, 169-71
 ATAD model, 170
 atmospheric boundary layer, 170
 backward-in-time trajectories, 171
 BAT model, 170
 MESOPUFF II dispersion model, 170
 trajectory analysis, 169
 model-calculated trajectories, 171-73
 modeling long-range transport
 modeling considerations, 176-77
 spore viability and deposition, 180-82
 transport models types, 177-80
 physical processes in the atmospheric boundary layer, 173-75
 definition of ABL, 173
 dispersion, 175-76
 modeling the diffusion process, 176
 thickness of ABL, 174
 turbulence, 173-74
 turbulence structure, 174-75
 verification of models, 184
 Plasmids
 mitochondria, 386

- Rhizoctonia*, 139
Podospira anserina, 386
Polygalacturonase, 410, 415, 417
Polygalacturonate, 411
Potato
 cropping frequency and yield, 342-44
 growth promoting pseudomonads, 346-48
 interactions with deleterious rhizobacteria, 351
 root colonization, 349
 tuber treatment, 347
 yield increase, 352-53
Potato spindle tuber disease, 14
Potassium, 238, 242, 278, 280
Potter, M. C., 67
Price, T. V., 77
Proline, 342, 345, 353
Pronase E, 239
Propiconazole, 299
Proteases, 418-20
Pseudobactin, 348, 351-52, 358
Pseudomonas
 fluorescens, 101, 351
 root colonization, 349-50
 putida, 102, 347-49, 351
 root colonization, 350
 solanacearum, 147, 158, 160-61
 species, 342-43, 345, 352
 chemotaxis, 349-50
 plant growth-promoting strains, 346-48
 survival on root residue, 353
 syringae, 101, 148, 159
 ice nucleation gene, 100
 syringae pv. *glycinea*
 avirulence gene, 96-97
 avirulence gene expression, 148
 syringae pv. *syringae*, 348
 syringae pv. *tomato*
 avirulence gene, 148
 syringae subsp. *savastanoi*
 IAA genes, 92-93
Puccinia
 coronata, 98, 239
 graminis
 appressorium formation, 238
 isozyme loci variation, 393
 uredospore germ tube orientation, 237
 graminis f. sp. *secalis*
 gene flow, 396
 graminis f. sp. *tritici*
 gene flow, 396
 population genetics study, 395
 graminis tritici, 239
 heat shock, 241
 hordei, 372
 psidii, 233
 recondita f. sp. *tritici*, 395
 striiformis, 386
Pycniospores
 host penetration, 234
R
Ravenelia humphreysana, 233
Rawlins, T. E., 27
Reinking, 70
Rem, L. T., 76
Rhizobium, 145-68
 avirulence determinants, 161
 cell-surface oligosaccharides and polysaccharides role, 158-61
 common nodulation genes, 152-55
 genetic requirement for nodulation, 151
 host-specific nodulation genes, 155-58
 definition, 156
 hypersensitive reaction, 161
 infection process summary, 148-49
 schematic representation, 150
 infection strategies in plant-microbe interactions, 146-48
 introduction, 145-46
 isolation and identification of nod genes, 151-52
 leguminosarum, 151-52, 157, 159
 host-range gene, 156
 nodulation genes, 152-55
 meliloti, 152, 159
 host-specificity genes, 157-58
 nodulation genes, 152-53, 155
 phaseoli, 152
 refined parasitism, 161-63
 nod genes function, 162-63
 trifolii, 151-52, 159-60
 host-range gene, 156-58
 nodulation genes, 152-53, 155
Rhizoctonia solani, ecology and pathogenicity, 125-143
 anastomosis and intraspecific groups
 importance, 131-32
 number of anastomosis groups, 130
 teleomorphs, 130-31
Meloidogyne interactions
 root rot severity, 326-27
 biological bases of anastomosis and intraspecific groups, 132
 DNA base composition, 134
 electrophoresis of proteins and isoenzymes, 133-34
 serological relationships, 133
 vitamin requirement, 132
 conclusion, 139-40
 ecology and pathogenicity of groups, 135
 antagonism and biological control, 138
 breeding of resistant varieties, 137
 epidemiological role of basidiospores, 137-38
 geographical distribution, 135-36
 host plants and distribution, 136
 plasmids, 139
 population fluctuations within a field, 136-37
 dsRNA, 139
 suppressive soils and disease decline, 138
 viruses, 139
 intraspecific grouping, 127
 hyphal anastomosis grouping, 128-29
 hyphal fusion mechanism, 129
 interrelations among various groupings, 129
 morphological and pathological grouping, 127-28
 introduction, 125
Rhizoctonia and *Rhizoctonia solani*
 Rhizoctonia, 126
 Rhizoctonia solani, 126-27
Rhizopus nigricans, 261, 265
Rhizosphere microorganisms, beneficial and deleterious, 339-58
 beneficial rhizosphere microorganisms, 345-46
 plant growth-promoting pseudomonads, 346-48
 root colonization, 348-50
 concluding remarks, 354
 deleterious microorganisms
 cropping frequency effect, 343-45
 effect of cropping practices, 343

- identification, 340
 mode of action, 341-43
 terminology, 340
 failures of growth promoting
 rhizobacteria, 352-54
 interactions, 350-52
 introduction, 339
Rhopalosiphum padi, 298
Rhynchosporium secalis, 394
 Ribitol dehydrogenase gene, 158
 Rice
 see Bacterial blight of rice
 Rieman, G. H., 53
 Riker, A. J., 53
 Rishbeth, J., 70
 RNase
 virus infection prevention,
 118-19
 dsRNA, 386
 mRNA
 cross-protection, 102-3
 Roberts, W., 67
 Root exudates, 322, 326-27
 Root-knot nematodes
 see *Fusarium wilt* fungi and
 root-knot nematodes in-
 teractions
 Rovira, A. D., 69, 72, 74
 Russell, H. L., 51
 Rust fungi, changes during
 appressorium development,
 231-47
 appressoria and subsequent in-
 fection structures, 232-33
 aeciospores, 234
 basidiospores, 233-34
 pycniospores, 234
 uredospores, 233
 appressorium development in-
 hibition, 242-43
 differentiation and gene ex-
 pression
 differentiation-specific
 genes, 242
 protein synthesis, 240-41
 elucidation of mechanisms,
 243-44
 introduction, 231-32
 morphology and cytological
 development
 cytological changes after
 appressorium initiation,
 236-27
 nondifferentiated germ
 tube, 234-35
 signal receptors for dif-
 ferentiation
 extracellular matrix, 239-40
 second messengers in dif-
 ferentiation, 240
 triggers and signals for de-
 velopment initiation
 chemodifferentiation, 238-
 39
 thigm differentiation, 237-
 38
 Ryegrass staggers, 300-1
 S
 Saccharomyces cerevisiae, 390
 Salmonella typhimurium, 154
 Salt tolerance and crop produc-
 tion, 271-91
 detrimental effects of salinity,
 271-72
 energy costs, 275
 nutritional effects, 274-75
 plant growth, 272
 protective mechanisms
 against salinity, 276
 water relationships, 272-74
 introduction, 271
 protective mechanisms, 276
 against ion toxicity, 277-81
 against tissue water loss,
 276-77
 figure, 277
 strategies for crop production,
 281-82
 approaches to breeding and
 selection, 283
 crop management approach,
 281-82
 fertilization, 285-86
 genetic manipulation, 282-
 84
 grafting, 285
 hormone application, 286
 nutritional approach, 285
 oxygen enrichment, 285
 salinity as an advantage,
 286
 summary, 286
 Sanford, G. B., 68-69
 Sauret, S., 72
 Scher, F. M., 76
 Schizophyllum commune
 transformation, 94
 Schroth, M. N., 82-83
 Serine protease, 418
 Serratia marcescens
 chitinase, 101
 Seymour, A. B., 43
 Shipton, P. J., 76
 Siderophores, 346-48, 351-54
 see also Iron
 Simmonds, M., 69
 Smith, E. H., 47
 Smith, Erwin F., 51
 Smith, H. S., 67
 Smith, Ralph Eliot, 41-40
 early years, 42
 introduction, 41
 southern California, 48-50
 University of California, 43-
 48
 Snyder, W. C., 70
 Sobemoviruses, 112
 Sodium, 275, 278, 280, 283
 Soil
 characteristics
 effect on jarrah dieback,
 212-13
 fungistasis, 322, 326
 microbes
 Phytophthora cinnamomi
 suppression, 213-14
 Southern bean mosaic, 113, 115
 Sproul, William, 44
 Squash mosaic virus, 113, 115
 seed transmission, 116
 Stone, G. E., 43-44, 46
 Stotzky, G., 76
 Sugarcane rust, 170
 Suslow, T. V., 82
 Syringotoxin, 351
 T
 Taxol, 242
 Taylor, A. L., 68
 Taylor, C. B., 68
 Temperature
 Aspergillus, 262
 aflatoxin formation, 259-60
 Phytophthora cinnamomi,
 211-12, 219
 rust fungi
 heat shock effect, 241
 infection structure forma-
 tion, 238-39
 Thanatephorus
 corchoris, 126
 cucumeris, 126-27, 129-30,
 137
 orchidicola, 126
 sterigmaticus, 126
 Thiamine, 132-33
 Thigm differentiation, 237-39
 Thomashow, L. S., 83
 Ti plasmid
 Agrobacterium pathogenicity
 basis, 90-92
 gene insertion into plants, 18
 gene vector, 99
 Tobacco mosaic virus, 12, 15-
 16, 117
 inactivation by RNase, 119
 Tobacco necrosis virus satellite,
 13
 Tobacco ringspot virus, 14
 Tomato
 cation concentration in young
 plants, 279

- yield
 carbon dioxide and salt effect, 276
 salinity effect, 278
 Tomato bushy stunt virus, 13
 Toxins, 28-31
 Triadimefon, 191, 299
 Tridemorph, 201
 decrease in activity, 202
 Tristeza virus, 102
Trypanosoma brucei, 392
 Turgor, 274
 Turnip yellow mosaic virus, 12, 15, 17, 113
 Tveit, M., 71
 Tyloses, 324, 330
 Tymoviruses, 112
- U
- Uredospores, 239
 appressoria, 237
 initiation, 236
 germ tubes, 235
 germling, 240-41
 heat shock, 241
 responses to host surface, 237
 host entry, 233
Uromyces
appendiculatus, 232, 239, 243
 appressoria, 237-38, 240, 242
 uredospore, 235-36
 uredospore germling, 238-39, 241
fabae
 uredospores, 236
Ustilage
maydis
 genetic maps, 388
violacea
 genetic map, 388
 mitotic map, 394
- V
- Viroids, 14
- Virology, changing scene, 11-23
 conclusions, 21-22
 diagnosis, 19-20
 disease control, 17-18
 molecular biology and novel approaches, 18-19
 disease induction, 16-17
 introduction, 11-13
 nomenclature and taxonomy, 20-21
 satellite viruses, satellite RNAs, and viroids, 13
 virus replication, 15-16
 viruslike diseases caused by cellular parasites, 17
- Viruses
Rhizoctonia, 139
 Viruses, beetle transmission, 111-23
 beetle families
 Chrysomelidae, 113
 Coccinellidae, 113
 Curculionidae, 114
 Meloidae, 114
 beetle vectoring of viruses, 114-15
 epidemiology, 115-17
 virus acquisition, retention, and transmission, 115
 introduction, 111
 mechanisms
 gross-wounding technique, 117-18
 selective effect of ribonuclease, 118-19
 specificity of viruses, 117
 translocation, 119-20
 projections, 120-21
 virus groups, 111
 bromoviruses, 112
 comoviruses, 112
 other viruses, 112-13
 sobemoviruses, 112
 tymoviruses, 112
 von Tubeau, Karl, 43
 von Tubeuf, C. F., 67
- W
- Waite, M. B., 46
 Walker, John. Charles, 41-58, 70
 early years, 51-52
 relations with growers, 56
 students, 53-54
 use of language, 55
 Wisconsin, 53
 Water potential
 water salinity, 274
 Weindling, R., 68
 Weller, D. M., 80, 83
 Wickson, E. J., 48-49
 Windham, M. T., 83
 Wood, R. K. S., 71
 Wound tumor virus, 12
 Wright, J. M., 68
- X
- Xanthomonas*
campestris, 420, 423
campestris pv. *campestris*, 159
 pathogenicity basis studies, 93-94
campestris pv. *citri*, 159
campestris pv. *glycines*
 avirulence gene expression, 97, 148
campestris pv. *malvacearum*
 avirulence genes, 96, 148
campestris pv. *oryzae*
 see Bacterial blight of rice
campestris pv. *oryzicola*, 361
campestris pv. *phaseoli*, 97
campestris pv. *vasculorum*, 361
campestris pv. *vesicatoria*
 avirulence gene, 97, 148
 Xylan, 419
- Z
- Zoospores
Phytophthora cinnamomi, 212, 214-16, 220-21